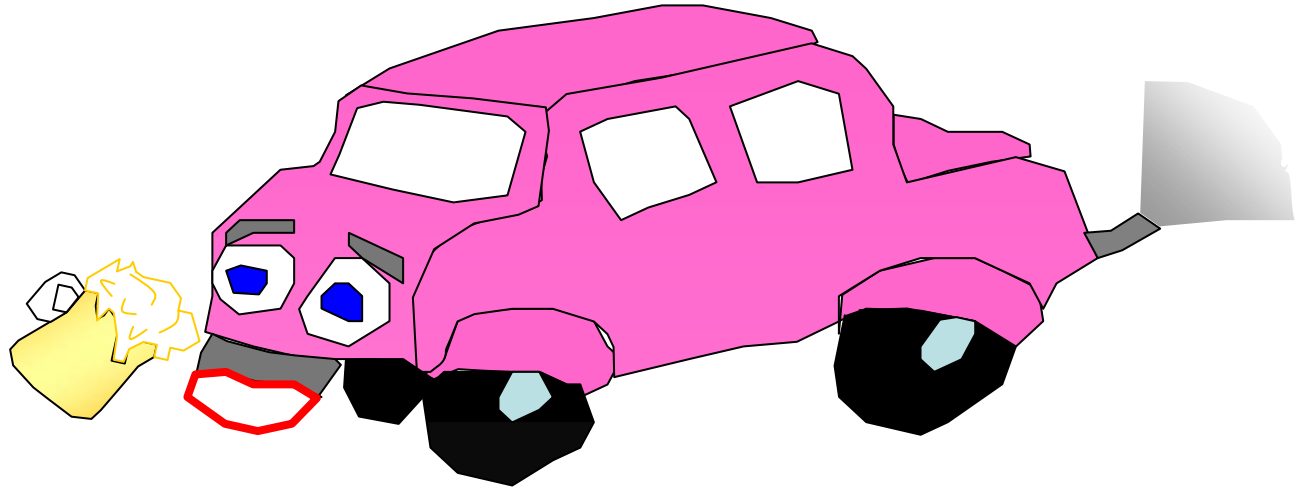


Is it Bad that My Car Drinks?

An Aerosol Perspective...



by Dabrina D Dutcher, University of Minnesota,
Departments of Mechanical Engineering and Public Health

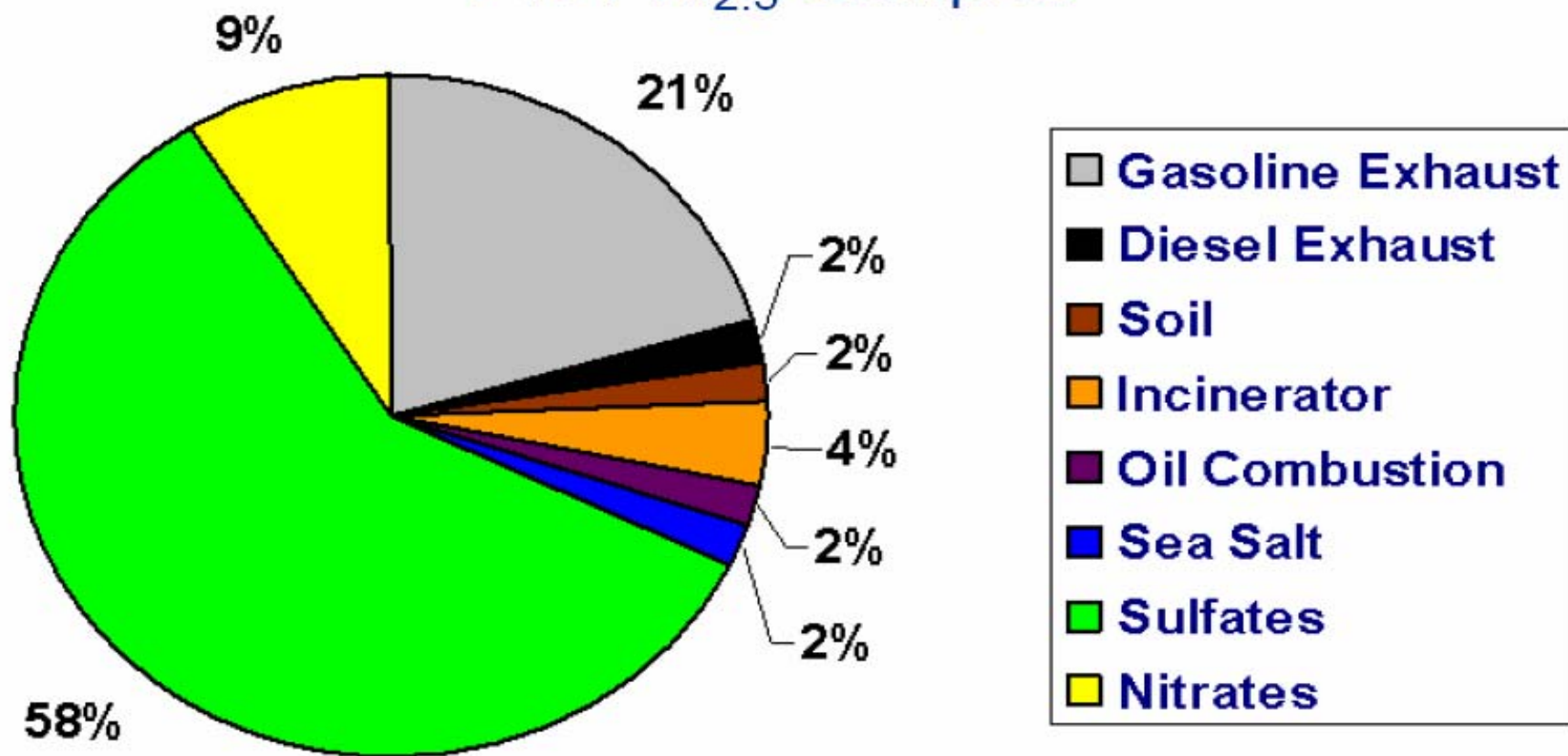
August 13, 2007



Upfront Acknowledgements

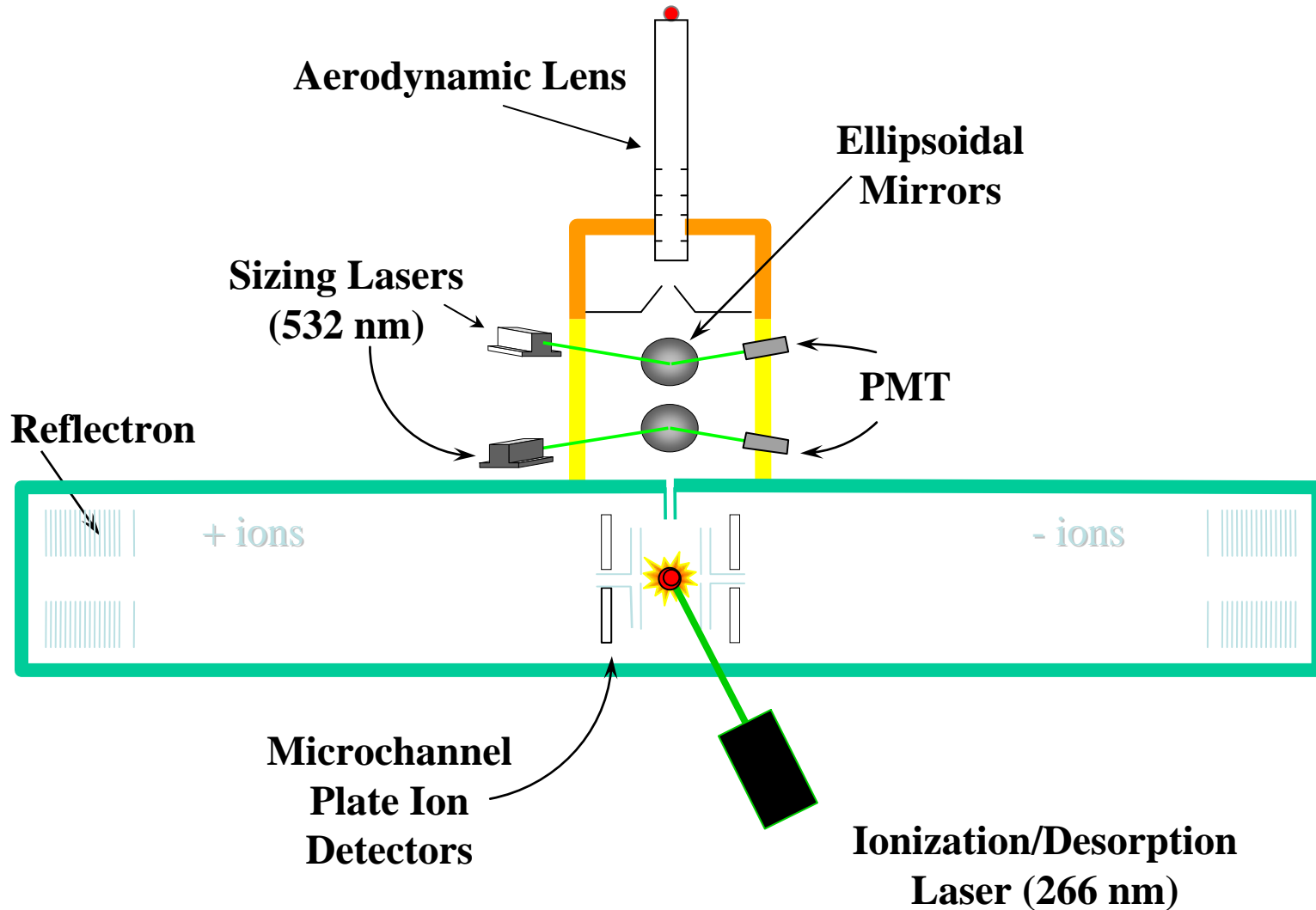
- Deborah Gross and Juan Medrano
- David Kittelson and Marcus Drayton
- Mark Stolzenburg and Peter McMurry

Washington, D.C. PM_{2.5} Source Apportionment
August 1988-December 1997
718 PM_{2.5} Samples



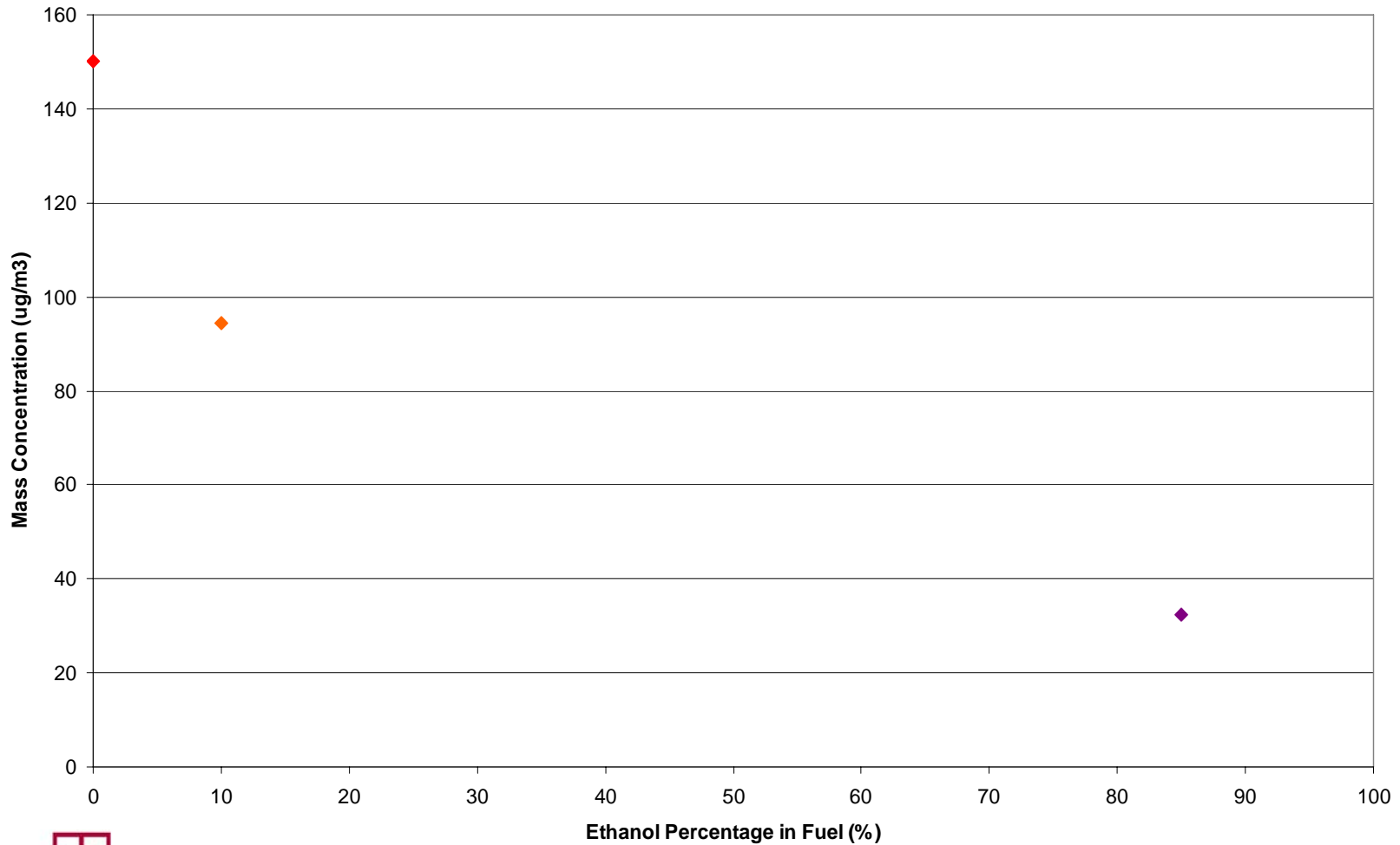
Source: Kim and Hopke, *JAWMA*, July 2004

TSI 3800: Aerosol Time of Flight Mass Spectrometer - AKA Wallace

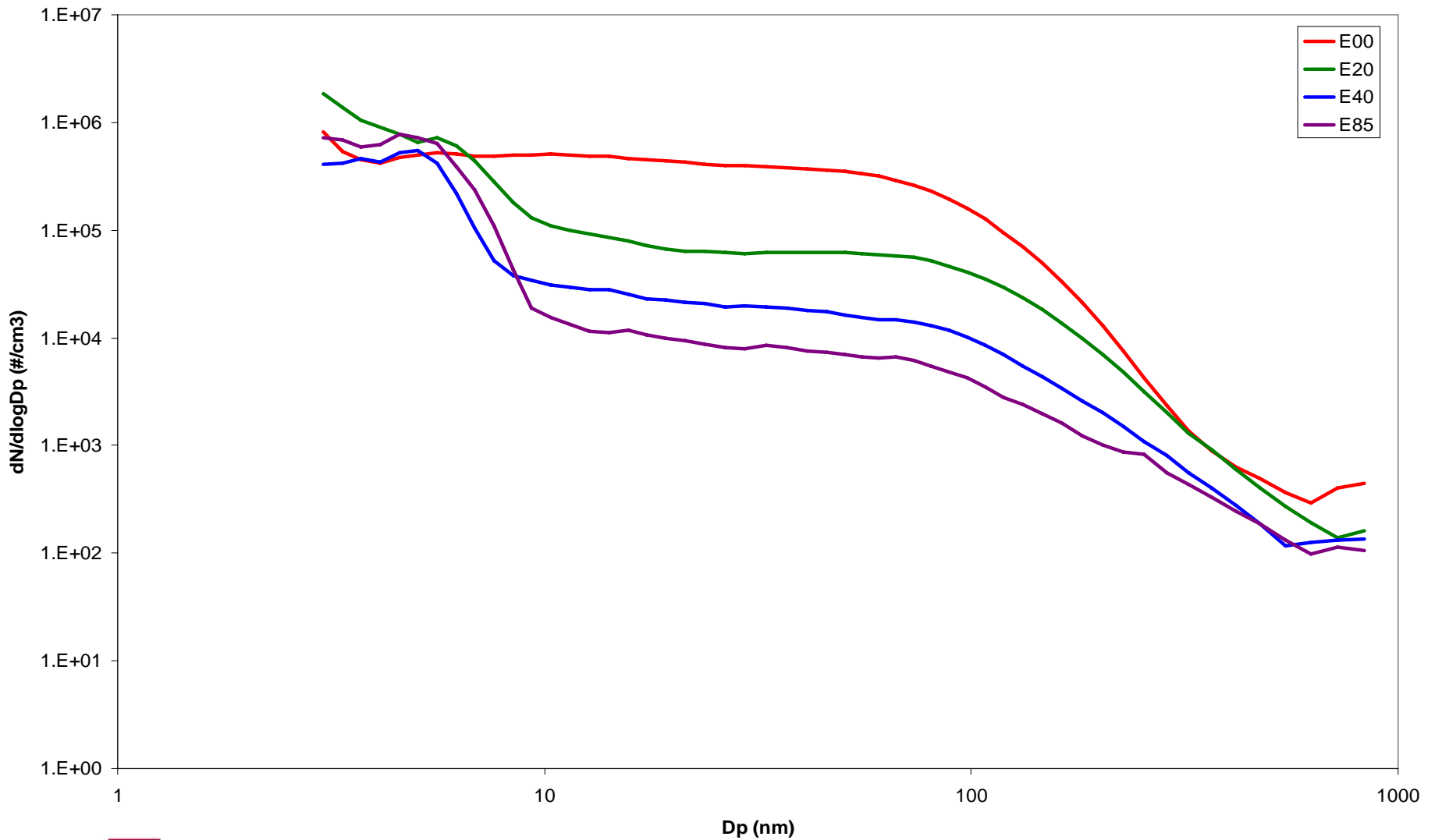


Particulate Matter Mass Concentration

Mass Concentration

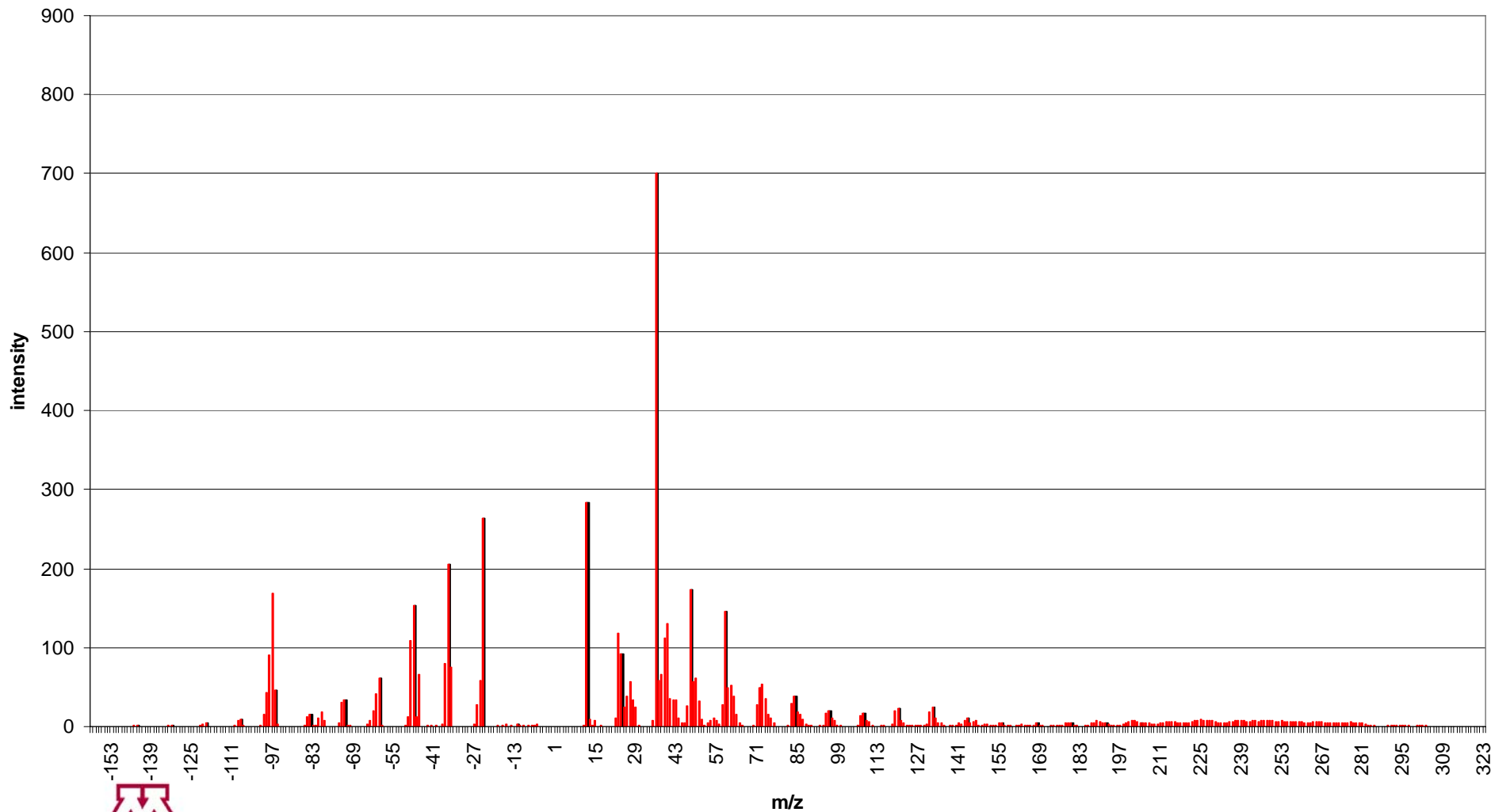


Particle Size Distributions



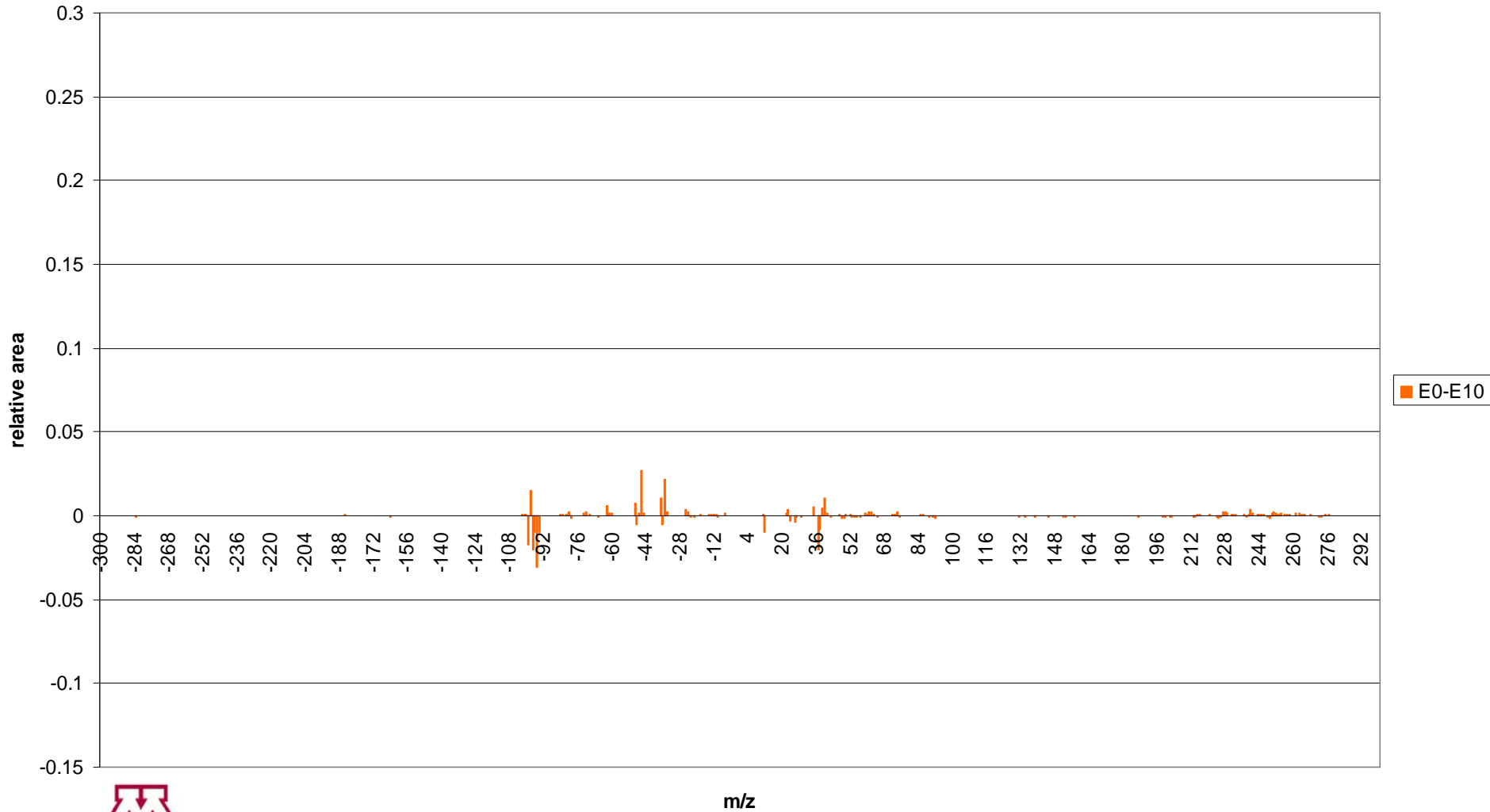
Averaged Mass Spectra: E00

E00



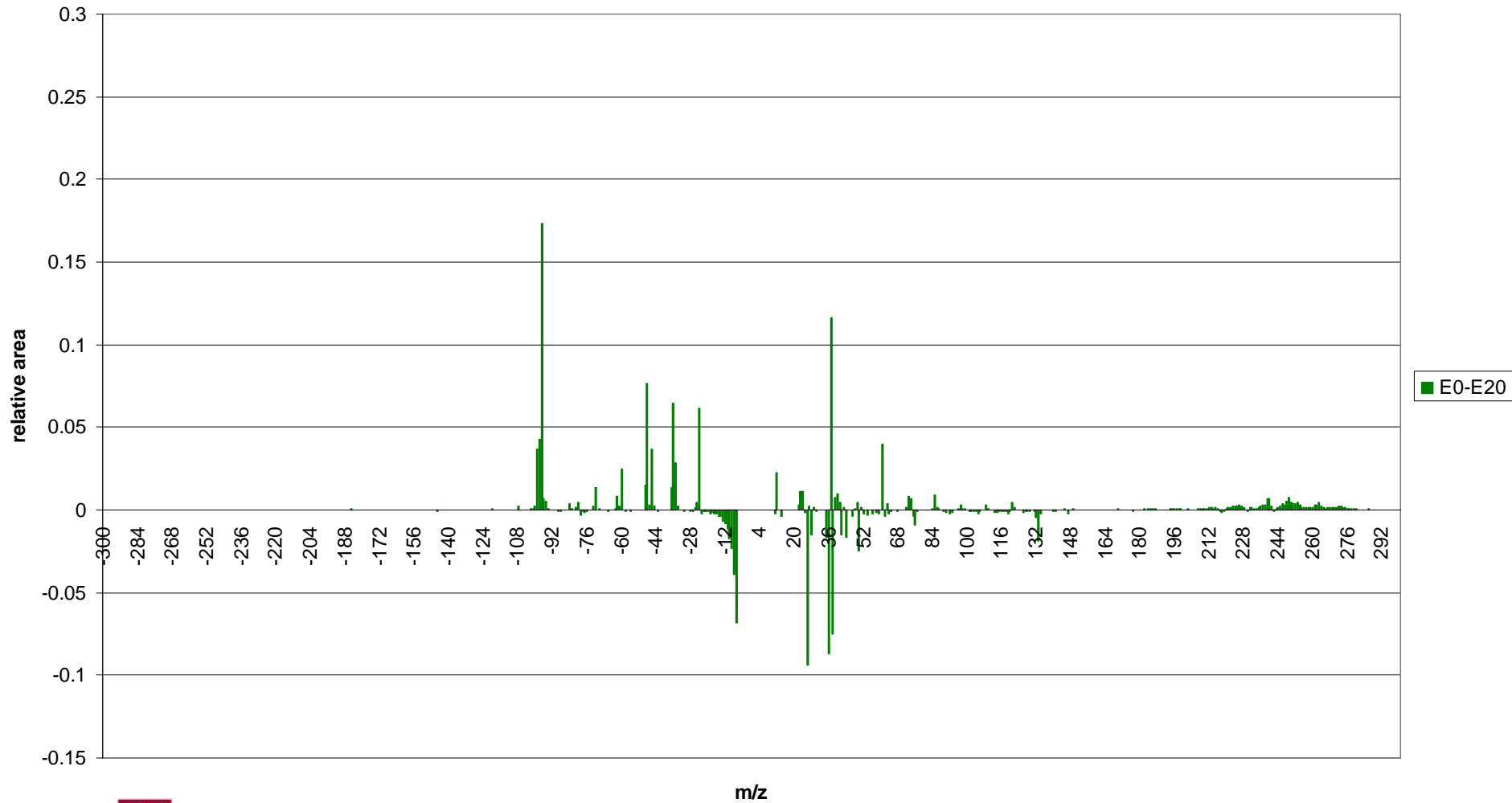
Averaged Mass Spectra: E00-E10

E00-E10



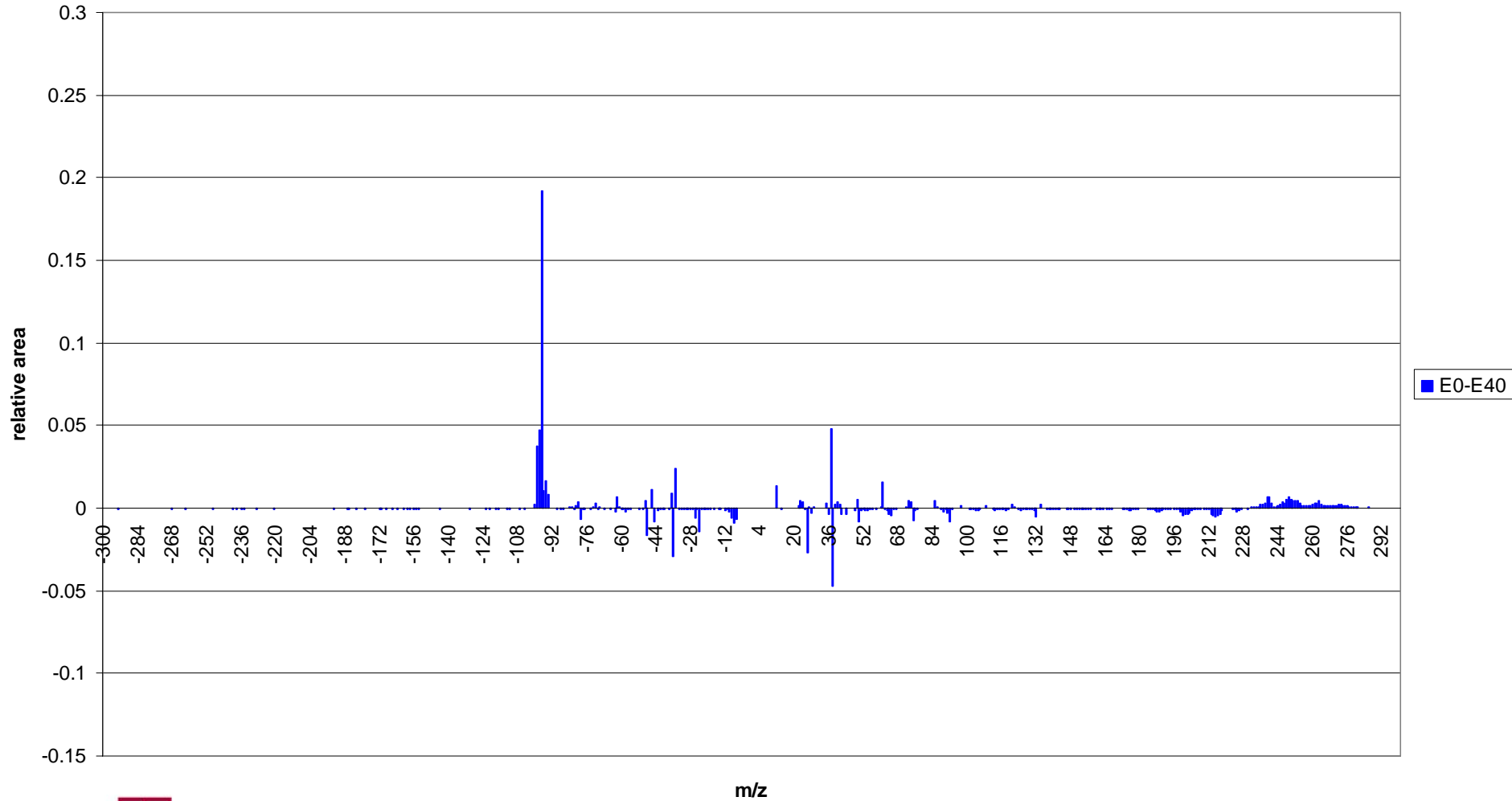
Averaged Mass Spectra: E00-E20

E00-E20



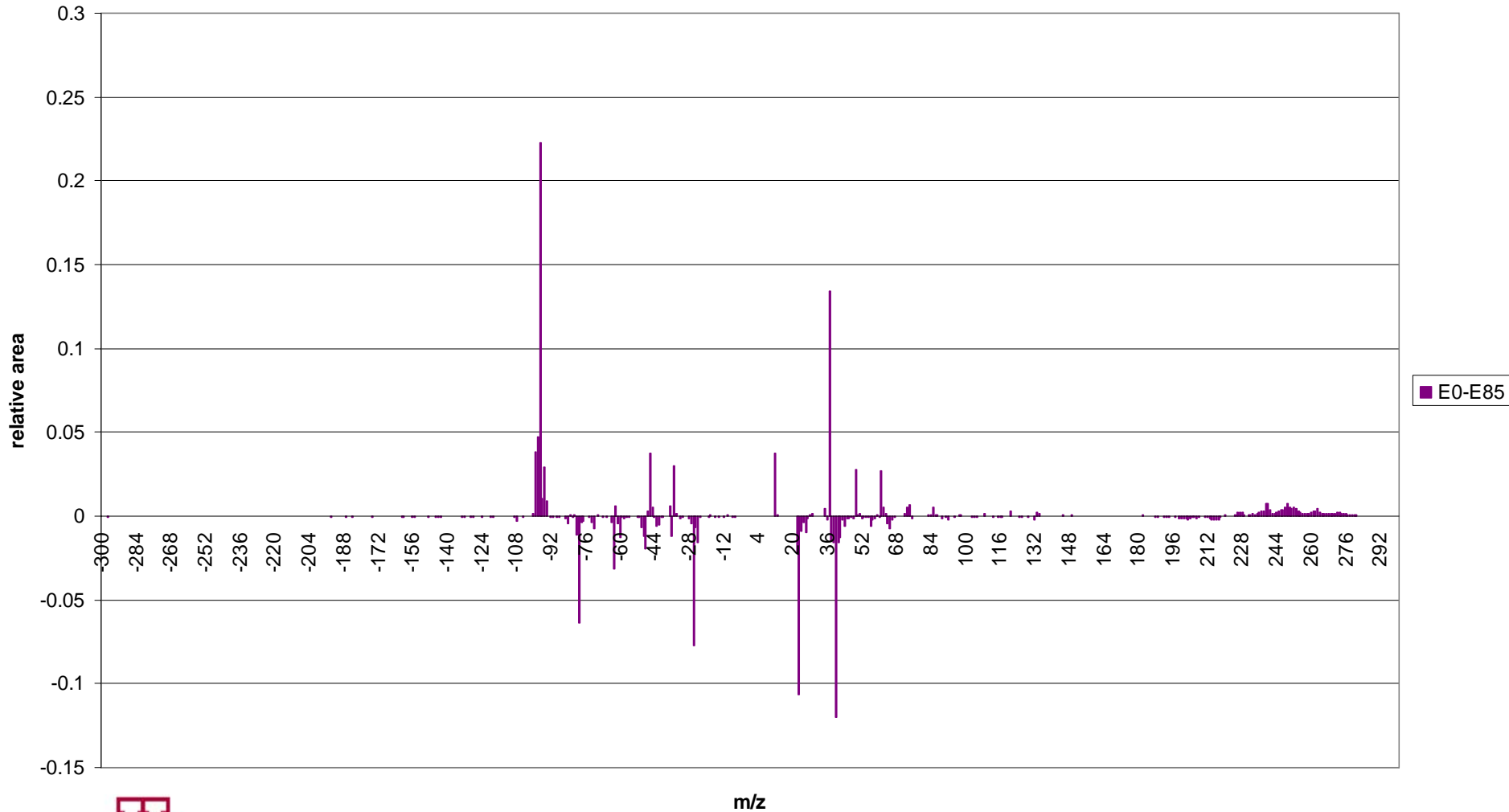
Averaged Mass Spectra: E00-E40

E00-E40



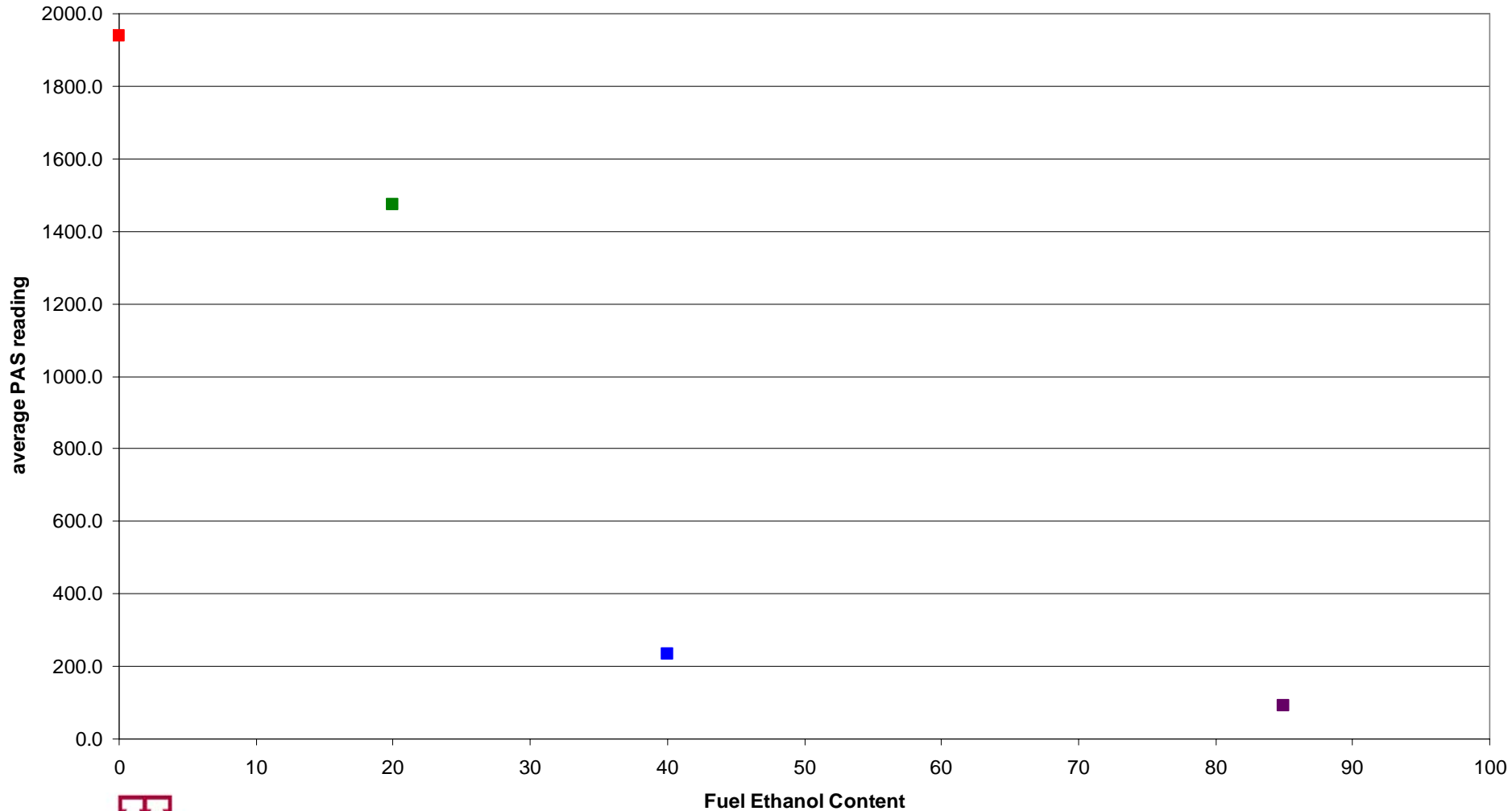
Averaged Mass Spectra: E00-E85

E00-E85



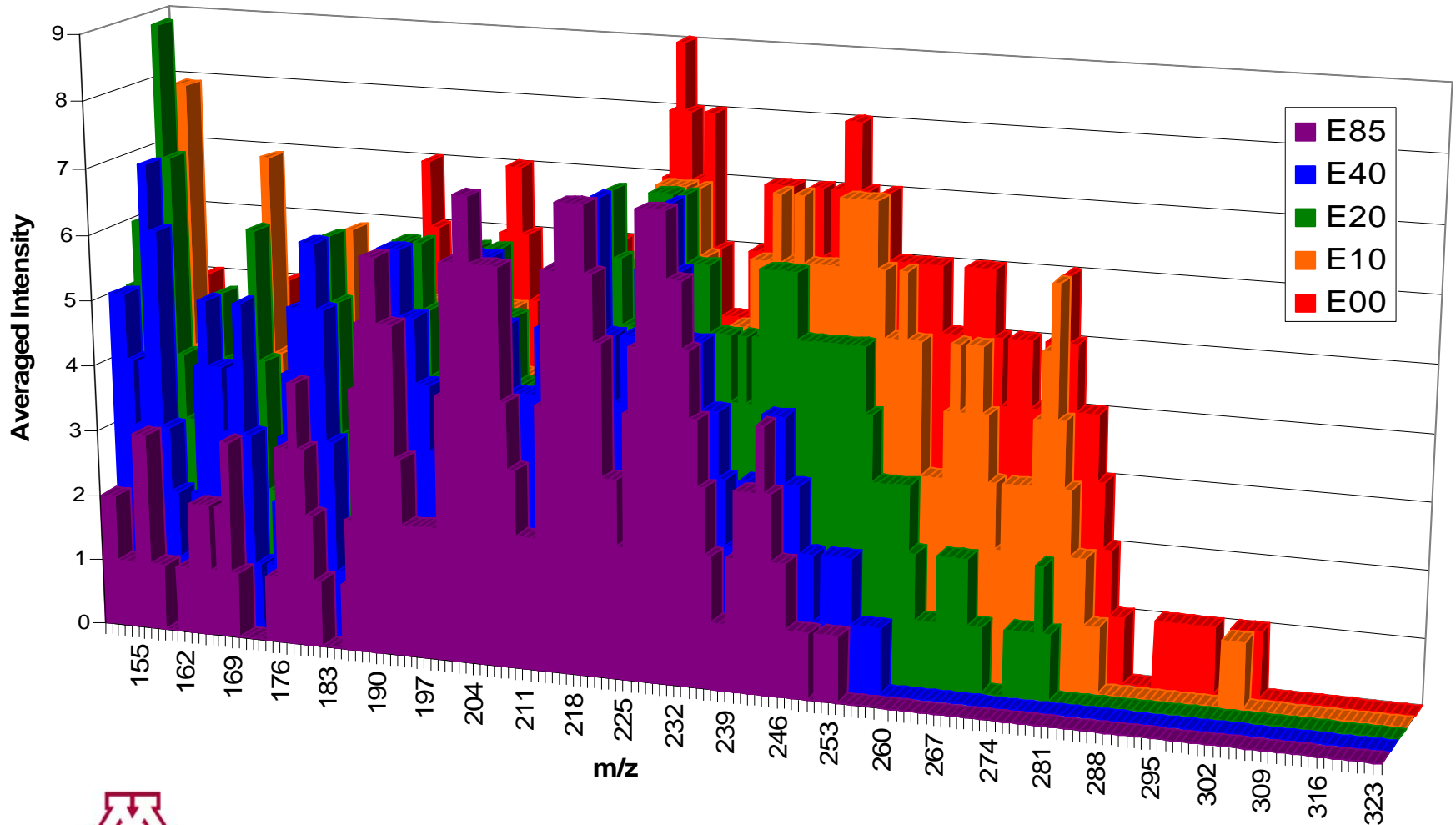
PAH Concentrations

PAS data



PAH Molecular Weight Distributions

PAH distributions

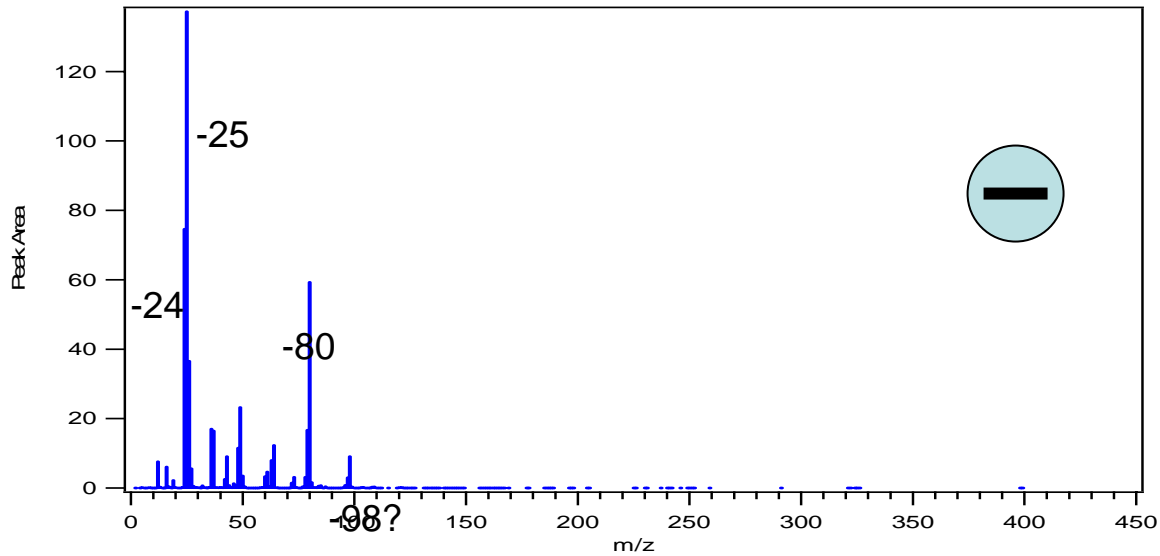
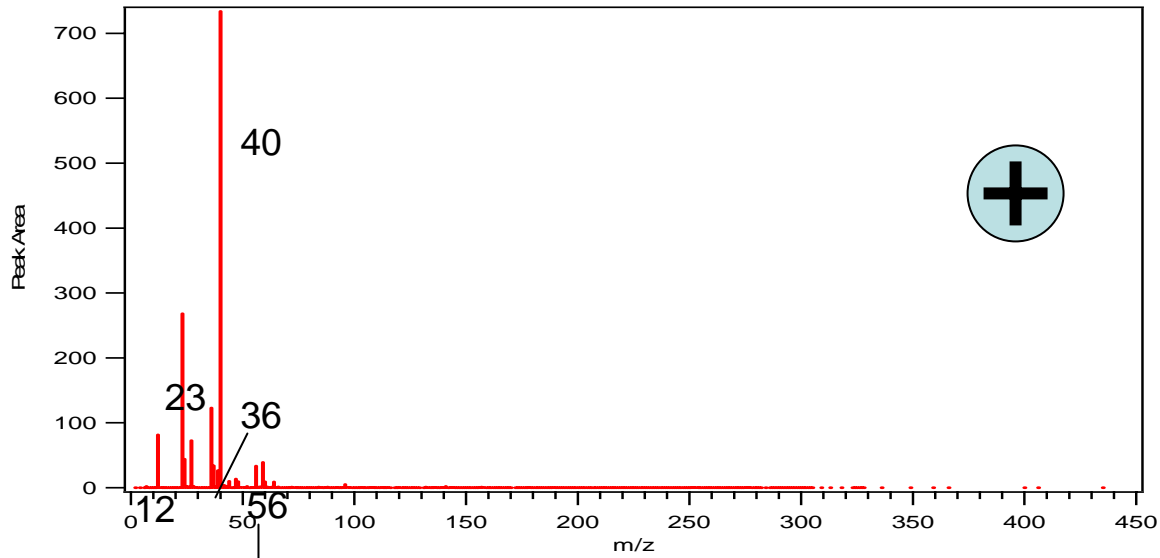


Cluster Centers

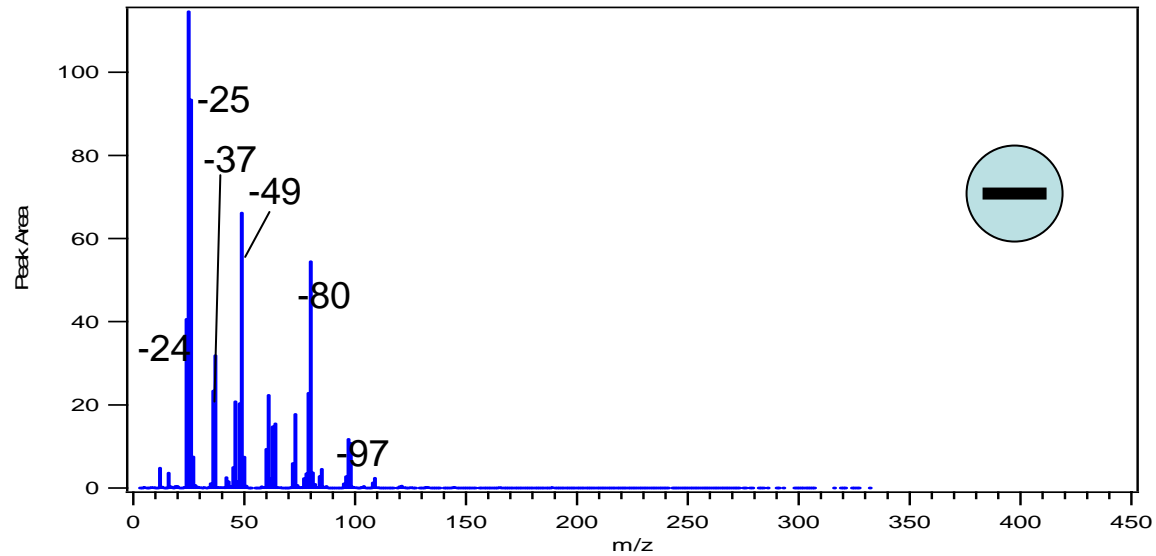
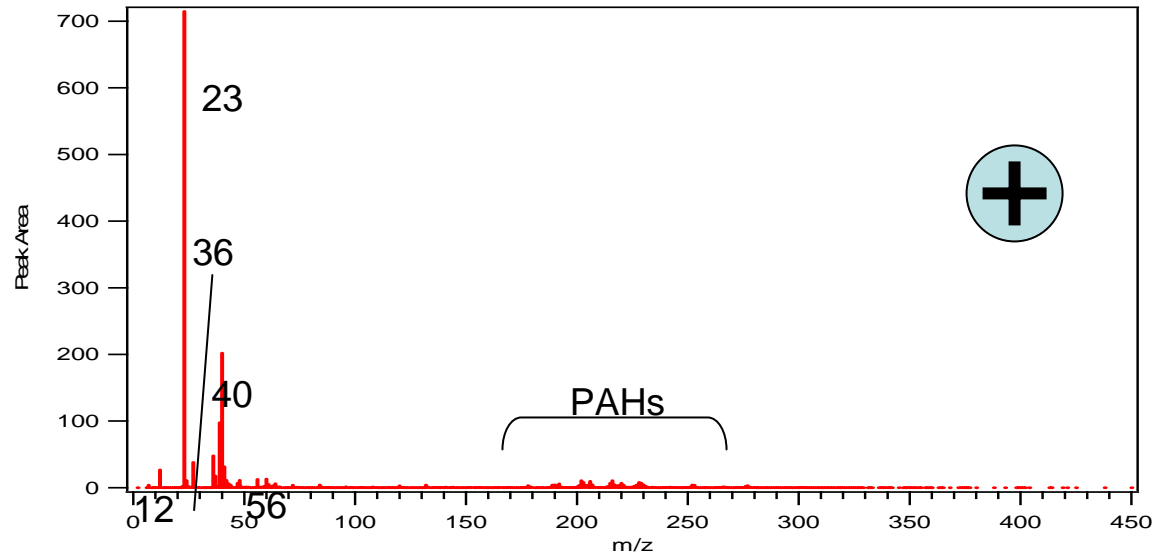
But didn't you say that this was a
SINGLE particle mass
spectrometer?

- From K-means clustering of each fuel type for each instrument
- Similar cluster centers are combined
- These are the union of all cluster centers for all of the fuel types for each instrument

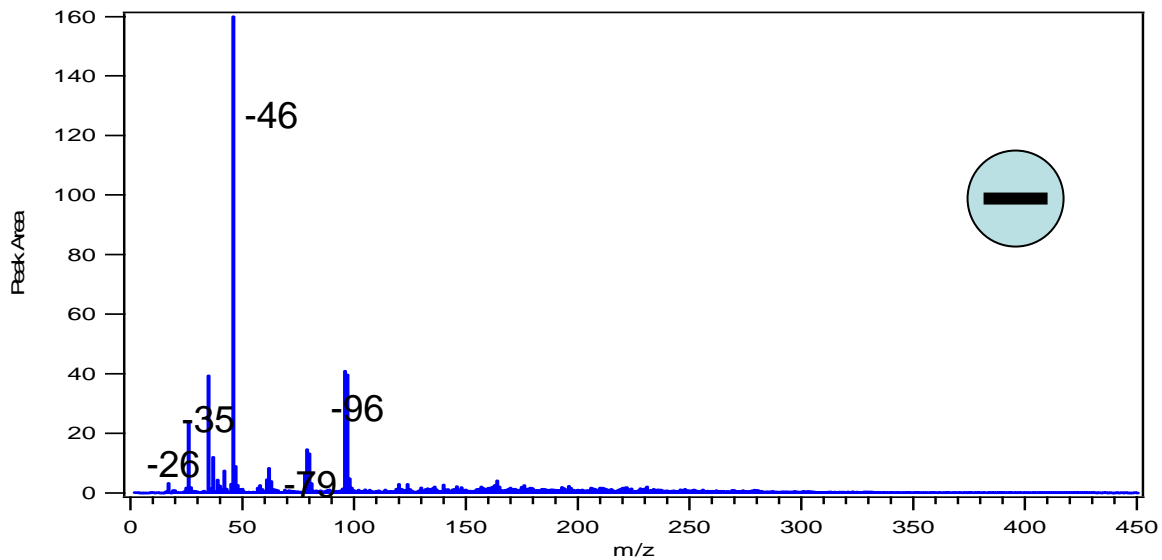
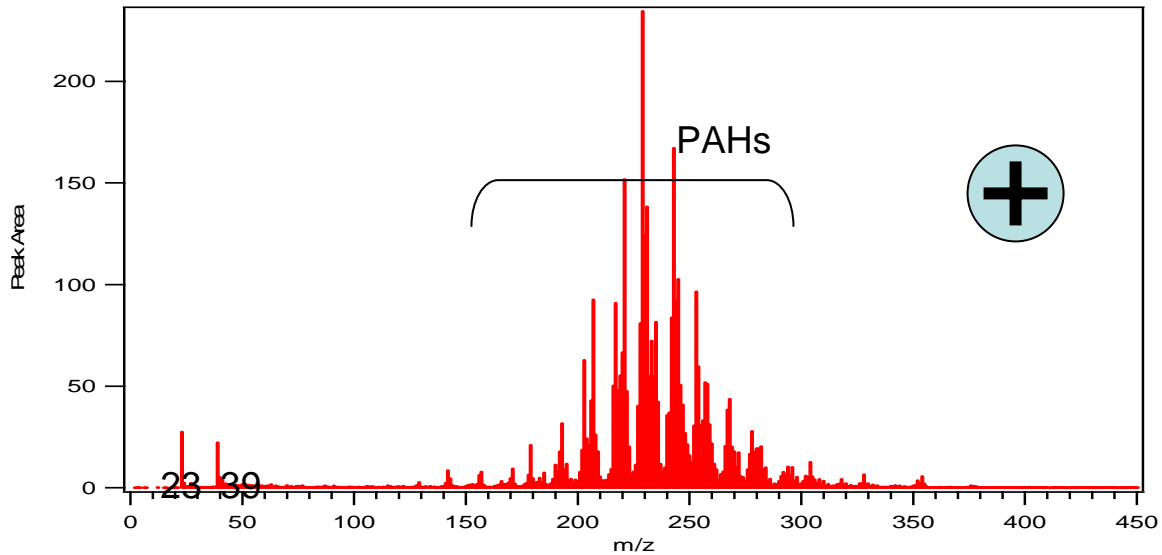
Low Mass EC + Ca



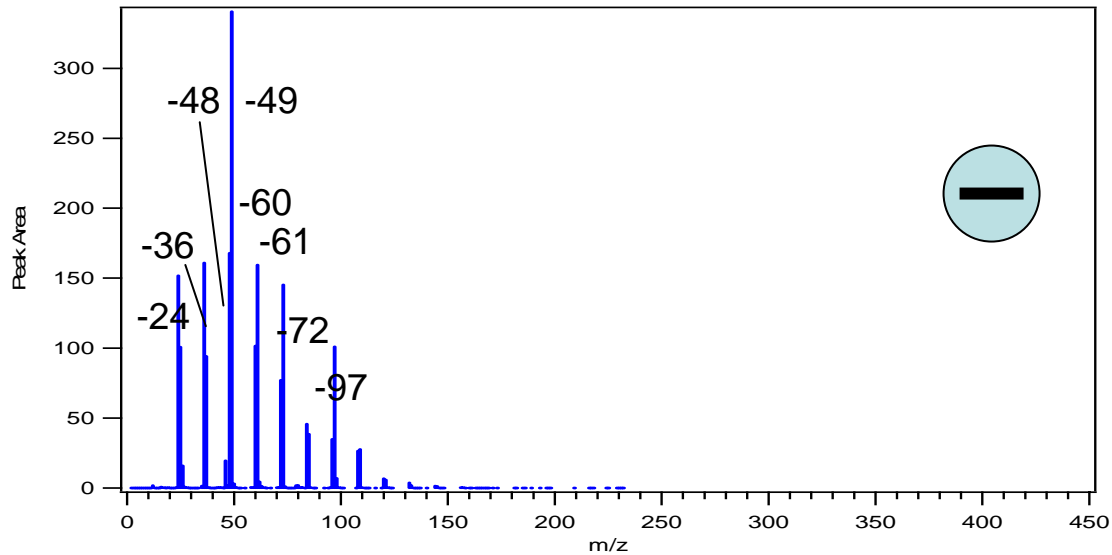
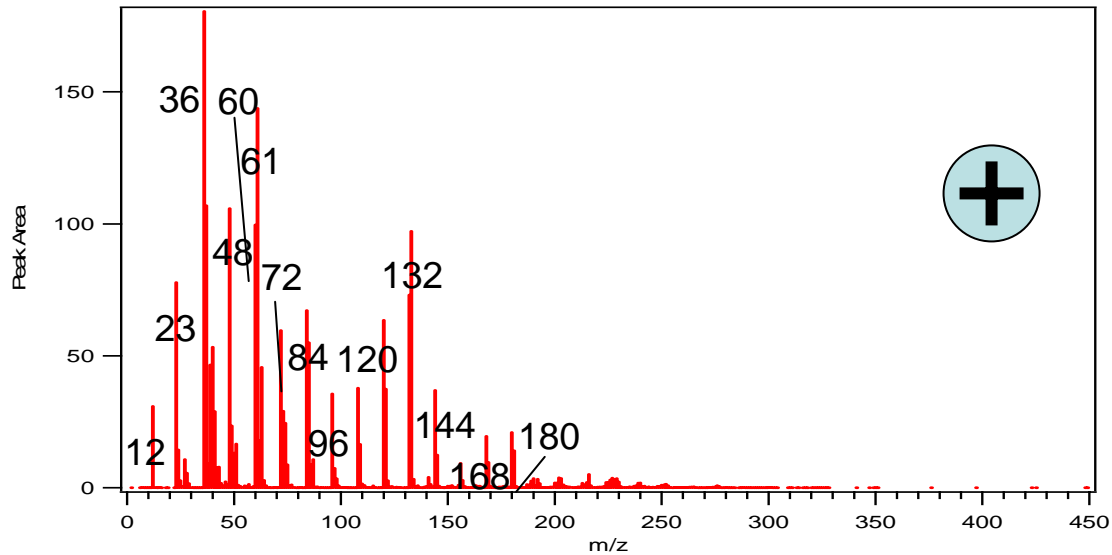
EC + PAH



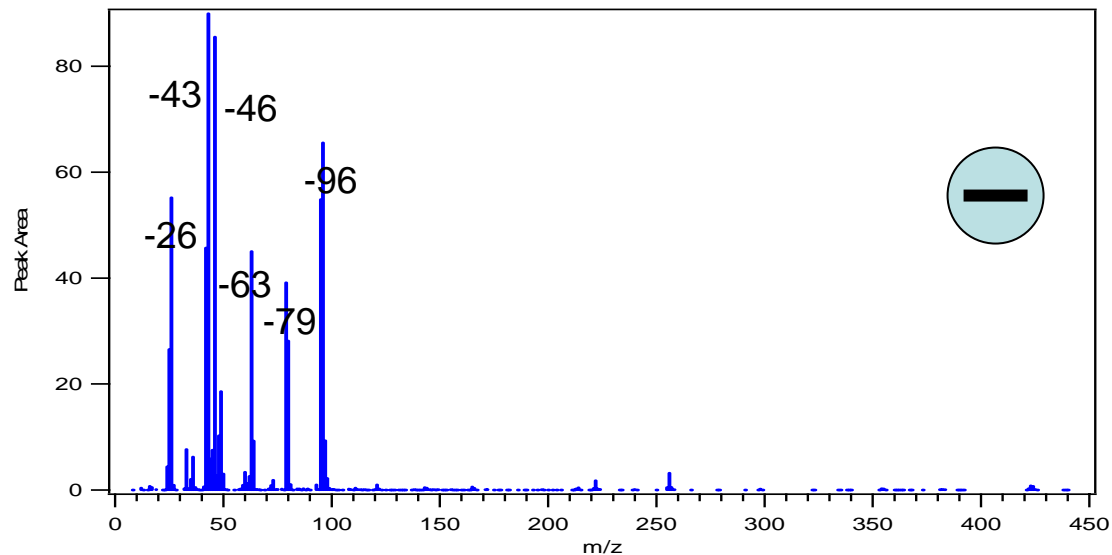
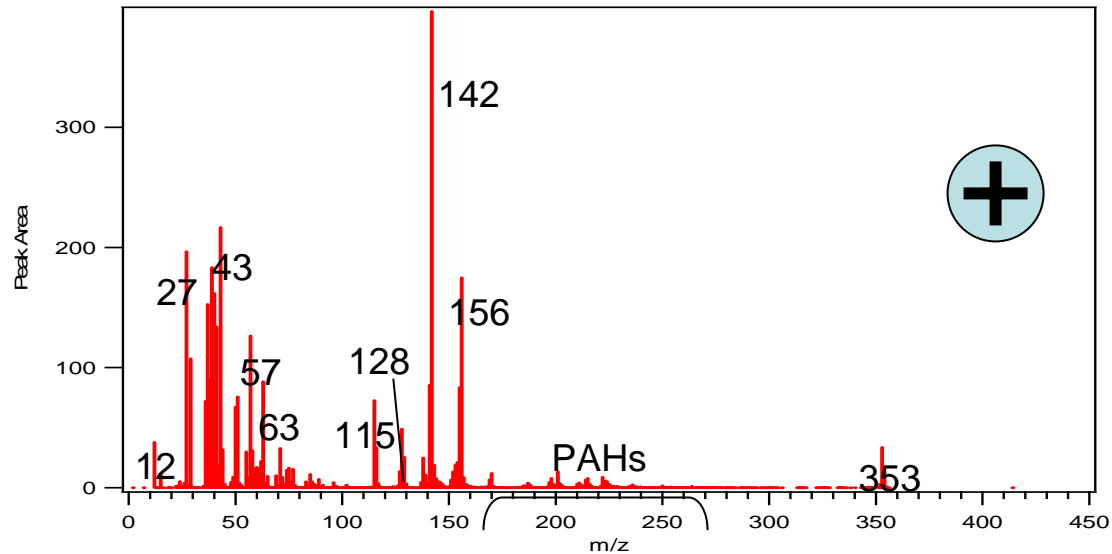
PAH + Nitrates



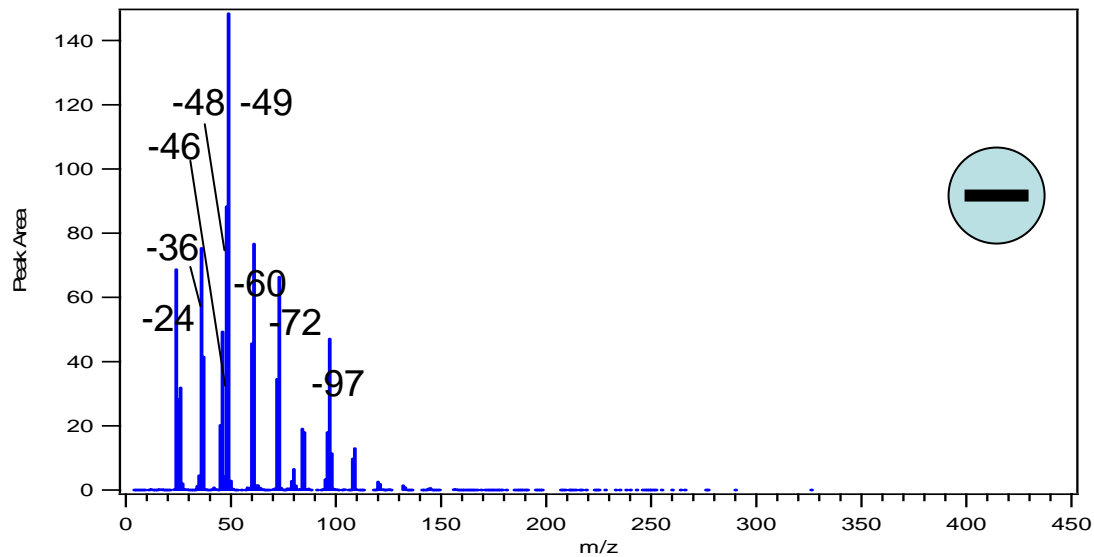
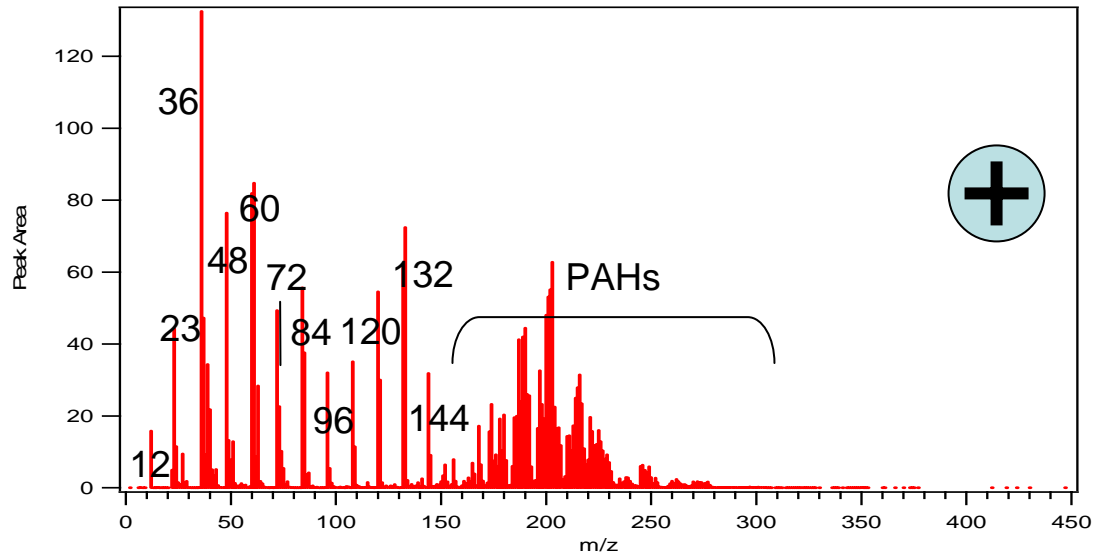
High Mass EC



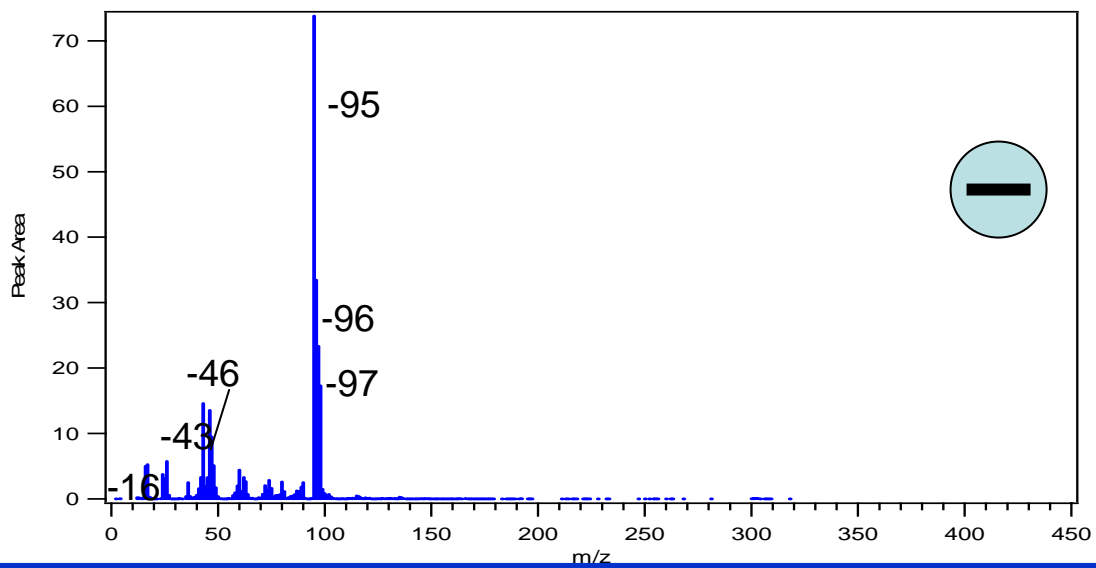
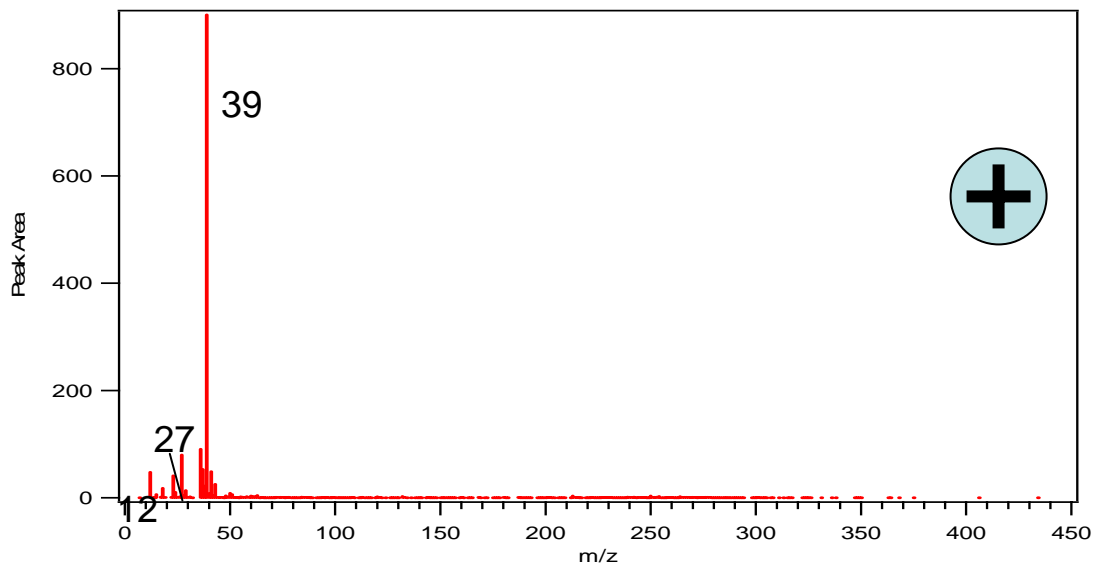
PAH + Lube Oil + Nitrates + S



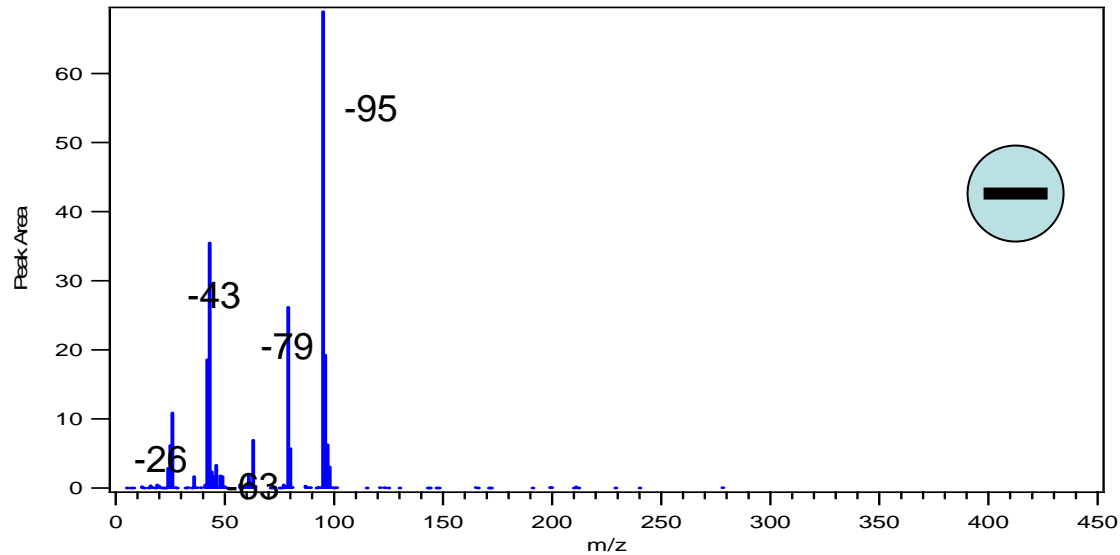
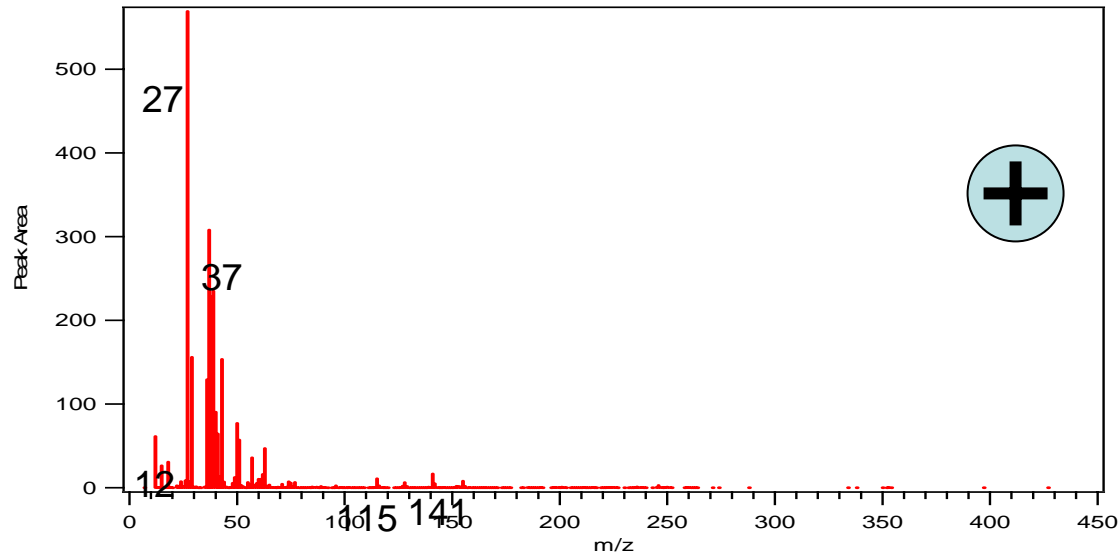
High Mass EC + PAH + Nitrates



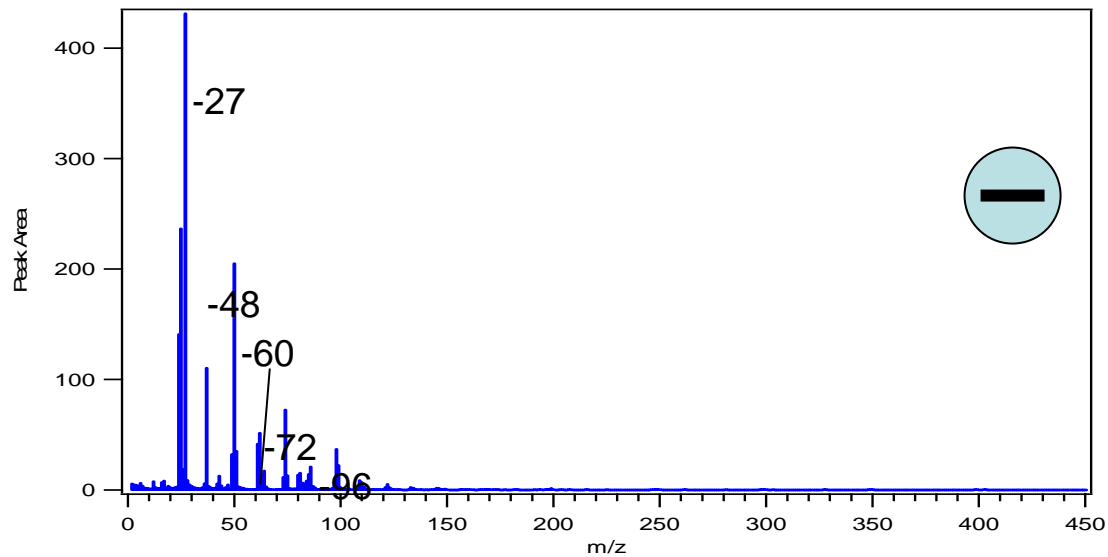
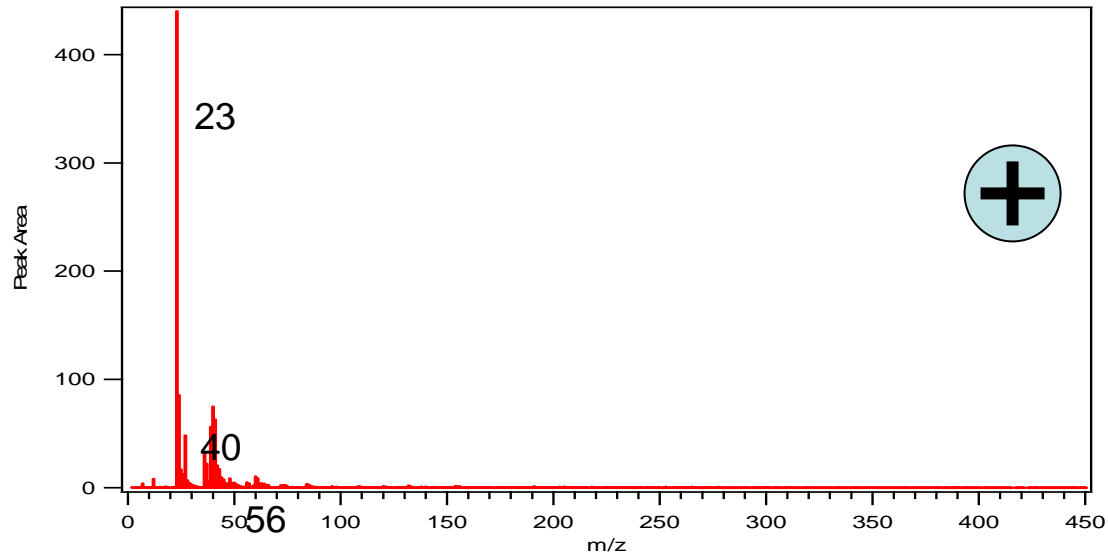
K



OC + Phosphate

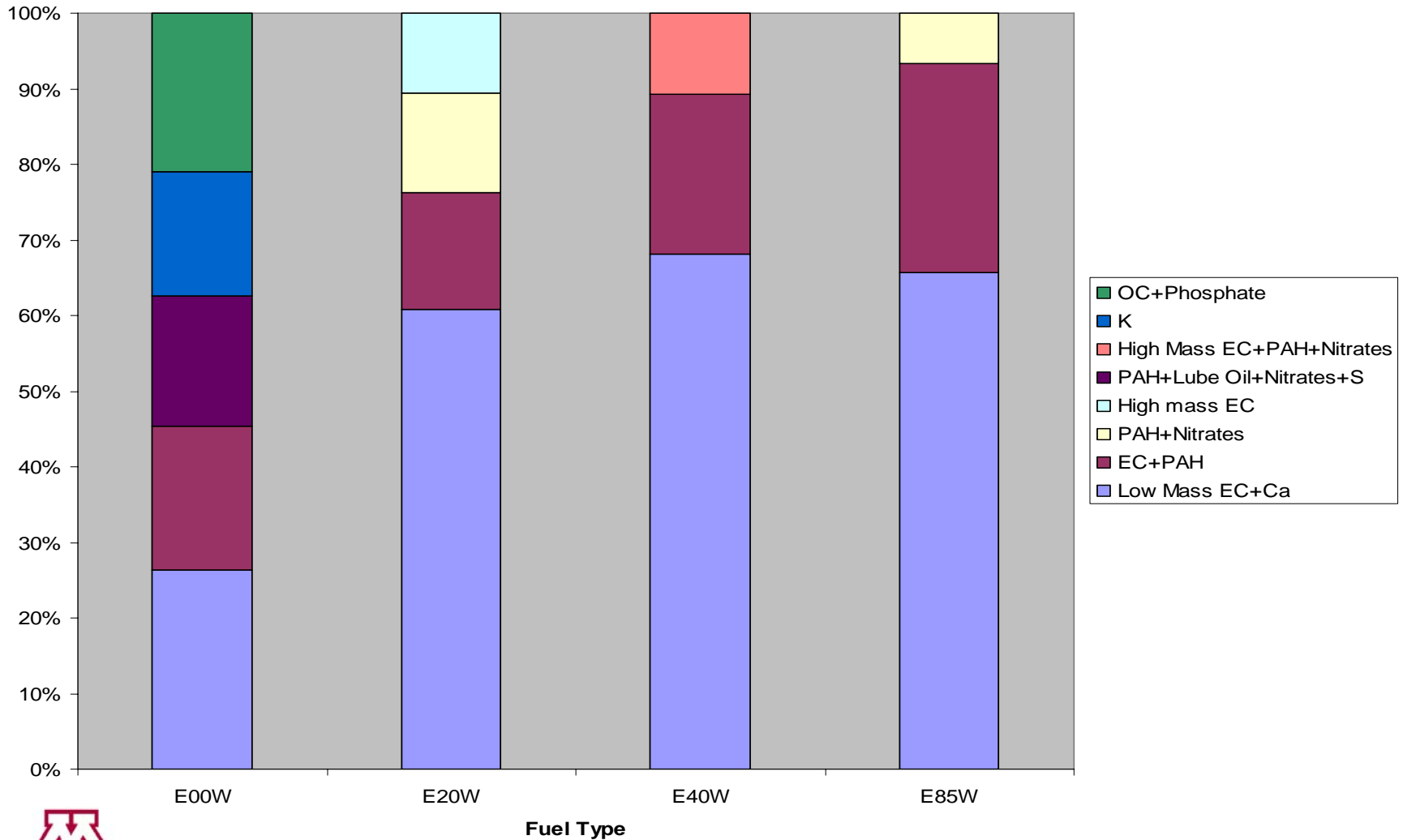


Unclassified



Populations of Clusters: Absolute Numbers

% Composition of particles



Functionalized PAHs?

E20+E40

